Title

OWL -O rbiting W ide-angle L ight-collectors (a satellite for observing high-energy cosmic rays

Physics Goals

Observe the air-shower induced fluorescenceof nitrogen in the atmosphere to measure the direction of the shower (to <1 degree) and the energy (to 14% at 10^20 eV) Goal is to determine the origin of the ultra high energy cosmic rays with energies above 10^20 eV. About 3000 such events/yr are expected. Viewing the atmosphere from above by two detector satellites provides stereoptic viewing of an enormous effective area (3 10^6 km^2 sr). Horizontal or Earth-skimming showers are signatures of ultra high energy neutrinos.

Features

Satellite-borne air-fluorescence telescope with PMT's or microchannel plates as focal plane detectors. Should locate the shower maximum to +/- 50 g/cm2, be able to distinguish (statistically) protons, nuclei and photons. Because the detector cannot operate in moonlight, the observing duty cycle is only 10%.

Technological Challenges

The challenge of building and operating a space-based instrument. The competition is EUSO, which stands for the Extremen Universe Space Observatory, and is part of the European Space Agency's plans for the International Space Station. The goal for EUSO is a three year flight starting in 2007

LBNL Contribution and Interest

None

Status

In study phase

Timeline

Experiment expected to operate 5 years. Anticipated launch date unknown (to me) at present, but the time scale for this experiment is lon. OWL is in NASA's mid term strategic plan and working to be advanced to NASA's near-term strategic plan. Proposals were submitted to the NSF in 2000.

Location

Work appears to be centered at Goddard Spaceflight Center.

Collaboration

NASA Goddard, Univ. Utah, Washington University; about 10 institutions all together

Funding Sources

NASA, NSF?

Resources, Links, and References

http://owl.gsfc.nasa.gov/intro.html

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